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a greater elevation. A new method of testing the question recently suggested itself to me and has been carried out with the aid of a Zeiss stereocomparator. In this instrument it is possible to observe, through a single eye-piece, (belonging to the new monocular micrometer attachment) a hydrogen plate superposed upon a calcium plate of the same date. The plates compared, are taken within so short an interval of time that no appreciable change occurs on the Sun between the exposures. The monocular eye-piece is provided with a device by means of which the light from either plate can be cut off, while the light from the other plate is admitted to the eye. The corresponding hydrogen and calcium flocculi can thus be observed in rapid succession, and the slightest relative displacement of their images can be detected and measured with the aid of the micrometer. Working in this way, especially near the Sun's limb, I found marked displacements of the hydrogen flocculi toward the limb. At the middle of the disk such displacements are almost entirely absent, though the observations are complicated by the fact that the hydrogen and calcium flocculi are not always identical in form. The results of a large number of measures of the relative positions of calcium and hydrogen flocculi leave no doubt in my mind, however, that the hydrogen flocculi, on the average, lie at a higher level, that the H_2 calcium flocculi. Such a difference of level would naturally cause displacements of the hydrogen flocculi with reference to the calcium flocculi, which should be in the direction of the limb and should increase with the distance from the center of the Sun. Such displacements are actually shown in the measures.

The method promises to be of considerable service, both in the comparative study of hydrogen and calcium flocculi, and in the investigation of differences of level of the calcium flocculi photographed with the H_1, H_2 and H_3 lines.

George E. Hale.

Identification of Faint lines in the Spectra of Sun-Spots.

In a recent paper by Mr. Adams and myself (*Contributions from the Solar Observatory,* No. 5), it was shown that the faint lines in the spectra of Sun-spots are coincident in position with the faint lines of the solar spectrum, though the solar lines are much fainter than the corresponding spot lines. Since most of these faint lines are not identified in Rowland's table of solar spectrum wave-lengths, the question of their identification was naturally raised. Mr. Adams and

Mr. Gale accordingly undertook a study of the subject in the laboratory, based upon the suggestion that long exposures of the arc spectrum might bring out many faint lines which are not given in published tables of wave-lengths. Such metals as titanium, vanadium and manganese, which are represented by many strong lines in the spectra of Sun-spots, were found to give numerous faint lines if the exposures were sufficiently prolonged. A large number of these lines have been identified with spot lines, precautions being taken to avoid mere chance coincidences. The investigation is being continued, and the spectra of all of the metals that are prominently represented in spot spectra will be studied in this way.

By the aid of photographic plates sensitized with pinachrome it has been found possible to obtain good photographs of the widened lines in the less refrangible region of spot spectra. The portion of the spectrum thus included in our regular work now extends from the red as far toward the violet as the widened lines are found.

George E. Hale.

Organization of the Computing Division of the Solar Observatory.

The measurements of photographs taken on Mt. Wilson, and the necessary computations, will for the most part be made at the Solar Observatory Office in Pasadena. An addition to the building has recently been completed, with a number of offices for computers. The Computing Division will be in charge of Mr. W. S. Adams, who will hereafter spend much of his time in Pasadena, though he will continue to carry on special investigations at Mt. Wilson as opportunity permits. Miss Louise Ware, who was associated with Dr. Schlesinger in his investigation of stellar parallaxes at the Yerkes Observatory, under a grant from the Carnegie Institution, will join the Computing Division on July 1st. Other computers are being secured, and as several more will be needed in the near future, applications from persons desiring to take part in this work may be sent to Mr. Adams at the Solar Observatory Office, Pasadena. A new globe measuring machine for heliographic positions is just being completed, and measuring machines for spectra have been obtained from Toepfer of Potsdam and Gaertner of Chicago. Calculating machines have also been provided, and it is hoped that the Computing Division will be in full operation within a short time.

George E. Hale.